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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

8/KW  
7/30/02

## In re Application of:

Takafumi TAGUCHI et al

Group Art Unit: 1733

Serial Number: 10/058,140

Examiner:

Filed: January 29, 2000

For: PNEUMATIC TIRE

DECLARATION UNDER 37 CFR 1.132Commissioner for Patents  
Washington, D.C. 20231

Sir:

I, Takafumi Taguchi, residing at 18-35-706, Uedanakamachi, Nishinomiya-shi, Hyogo-ken, Japan, duly declare and say as follows:

1. I graduated from Postgraduate Course of Electron Chemistry, Tokyo Institute of Technology, Tokyo, Japan, in the year 1982.

2. I have been employed since 1982 by Sumitomo Rubber Industries, Ltd.

3. Since 1982 I have been engaged in research and development on rubbers and rubber compositions for tires.

4. I am one of the named joint inventors of the above-identified patent application, and I have read and am familiar with the above-identified patent application.

5. I made experiments in order to show that the inner liner prepared according to the present invention has excellent crack-growing resistance and aging resistance as compared with the inner liner

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prepared according to Example II of Koch et al (U.S. Patent No.3,038,515).

6. Inner liners according to the present invention and Koch et al were prepared from the following rubber compositions by kneading the ingredients, forming into a sheet and cutting into test specimens having a size of 55 mm in length, 55 mm in width and 4 mm in thickness.

Table 1

Inner liner rubber composition		
Ingredients	Invention (part by wt.)	Koch et al (part by wt.)
Rubber component shown in Table 1	100	100
Carbon black	60	50
Process oil	10	3
Stearic acid	2	1.4
MgO	0.5	0.3
MBTS*1	1.5	0.7
ZnO	3	7
sulfur	0.5	2
Modified phenol-type resin	-	10
TMTD*2	-	0.35

\*1 Dibenzothiazyl disulfide

\*2 Tetramethyl thiuram disulfide

Each of the test specimens was placed on a sheet of a rubber composition for intermediate layer prepared according to the recipe shown in Table 2, and was press-cured at 150°C for 30 minutes.

The thus obtained cured rubber sheets were aged by heating at 110°C for 50, 100 and 150 hours. The unaged sheets and aged sheets were subjected to measurement of JIS A hardness.

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**Table 2**

Rubber composition for intermediate layer	
Ingredients	part by wt.
Natural rubber	100
Carbon black	50
Antioxidant	1.0
ZnO	10
Cobalt stearate	2.0
Process oil	2.0
Mercaptobenzothiazol sulfenamide	1.0
Sulfur	3.0

Also, with respect to the unaged sheets and the sheets aged for 150 hours, the crack-growing resistance was measured as follows: The intermediate rubber layer was peeled off from the cured rubber sheets. A groove was formed at the center of the obtained inner liner, and a 2 mm-width crack was formed at the bottom of the groove to give test specimens. The specimens were subjected to a bending test by using a De mattia fatigue test apparatus. The number of times of bending required until the width of the crack grew 1 mm was counted.

The results are shown in Table 3.

7. From Table 3, it would be understood that the inner liner according to the present invention has an excellent crack-growing resistance as compared with the inner liner prepared from a blend of chlorobutyl rubber and natural rubber according to Koch et al. Further, the increase in hardness of the inner liner according to the present invention by heat aging is smaller than that of the inner liner according to Koch et al. The crack-growing resistance of the aged inner liner according to the present invention is superior to that of the aged inner

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liner according to Koch et al. Thus, it would also be understood that the inner liner according to the present invention has a higher aging resistance or durability than the inner liner prepared according to Koch et al.

Table 3

Run No.	a	b	c	d	e	f	g	h (Koch)
Rubber component								
Chlorobutyl rubber	-	-	-	-	-	-	-	80
Bromobutyl rubber	65	70	80	90	95	55	100	-
Regular butyl rubber	35	30	20	10	5	45	-	-
Natural rubber	-	-	-	-	-	-	-	20
Hardness (JIS A hardness)								
Unaged	50	51	53	58	57	48	58	62
Aged 110°C 50 hours	51	52	55	58	59	48	61	65
Aged 110°C 100 hours	51	54	56	60	62	49	63	68
Aged 110°C 150 hours	52	55	58	62	64	49	66	71
De mattia cut growth								
Unaged	40x10 <sup>6</sup>	>40x10 <sup>6</sup>	>40x10 <sup>6</sup>	23x10 <sup>6</sup>	15x10 <sup>6</sup>	40x10 <sup>6</sup>	5x10 <sup>6</sup>	5x10 <sup>6</sup>
Aged 110°C 150 hours	14x10 <sup>6</sup>	11x10 <sup>6</sup>	7x10 <sup>6</sup>	2.3x10 <sup>6</sup>	1.4x10 <sup>6</sup>	16x10 <sup>6</sup>	0.2x10 <sup>6</sup>	0.05x10 <sup>6</sup>

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The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

This 22nd day of July, 2002

by TAKAFUMI TAGUCHI.  
Takafumi Taguchi

We, the undersigned witnesses, hereby acknowledge that Takafumi Taguchi is personally known to us and did execute the foregoing Declaration in our presence on:

Date: July 22, 2002

Witness

Yutaka Sakon

Date: July 22, 2002

Witness

Keiji Akihino

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## facsimile transmittal

To: **Examiner Geoffrey KNABLE** Fax: 703-872-9310

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Attn: Date: 07/26/02

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From: Garth M. Dahlen, Ph.D. (#43575) Pages: 29 (including cover)  
Andrew D. Meikle, Esq. (#32,868)

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Re: 10/058,140

☐ Urgent ☐ F.Y.I. ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Dear Examiner Knable:

Thank you for speaking with me earlier today in connection with the subject case. As per our conversation, I am enclosing a Preliminary Amendment and a Rule 132 Declaration for your consideration. We eagerly await your decision regarding the patentability of the present invention.

Please feel free to call me if you have any questions.

Regards,  
Garth  
703-205-8030

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